Ashland Wastewater Treatment Facilities

Open House

October 11, 1992

Introduction

Welcome to the Ashland Wastewater Treatment Plant. The facility is owned by the City and operated by the Ashland Wastewater Utility. The plant provides a high level of treatment of the wastewater discharged to the Chequamegon Bay. It also helps protect public health from waterborne disease.

Recent wastewater system improvements consisted of four projects:

1) A new wastewater treatment plant to replace the existing plant located near the City marina on Chequamegon Bay. The original plant was constructed in 1954 and upgraded in 1970.

2) A wastewater conveyance system project, including a new gravity sewer that diverts flow from the former treatment plant to a new main lift station. The new lift station pumps the City's wastewater through a 24-inch force main to the new treatment plant. The project also included an 8,000-foot outfall line that conveys the plant's treated wastewater 1,300 feet into Lake Superior. The final part of the conveyance system project included upgrading five of the ten existing lift stations in the wastewater collection system.

3) The Third Street utility and street improvement project. A 21-inch gravity sewer was installed from Beaser Avenue to 6th Avenue on Third Street and 6th Avenue from Third Street to Highway 2. The new sewer corrects problems caused by an undersized collection system serving this area. Water main replacement and a new street were also part of this project.

4) The Bayfront project. A lift station, gravity sewer and force main were installed to serve the Bayfront area, including the marina and RV Park.

These wastewater system projects were constructed from 1990 to 1992.

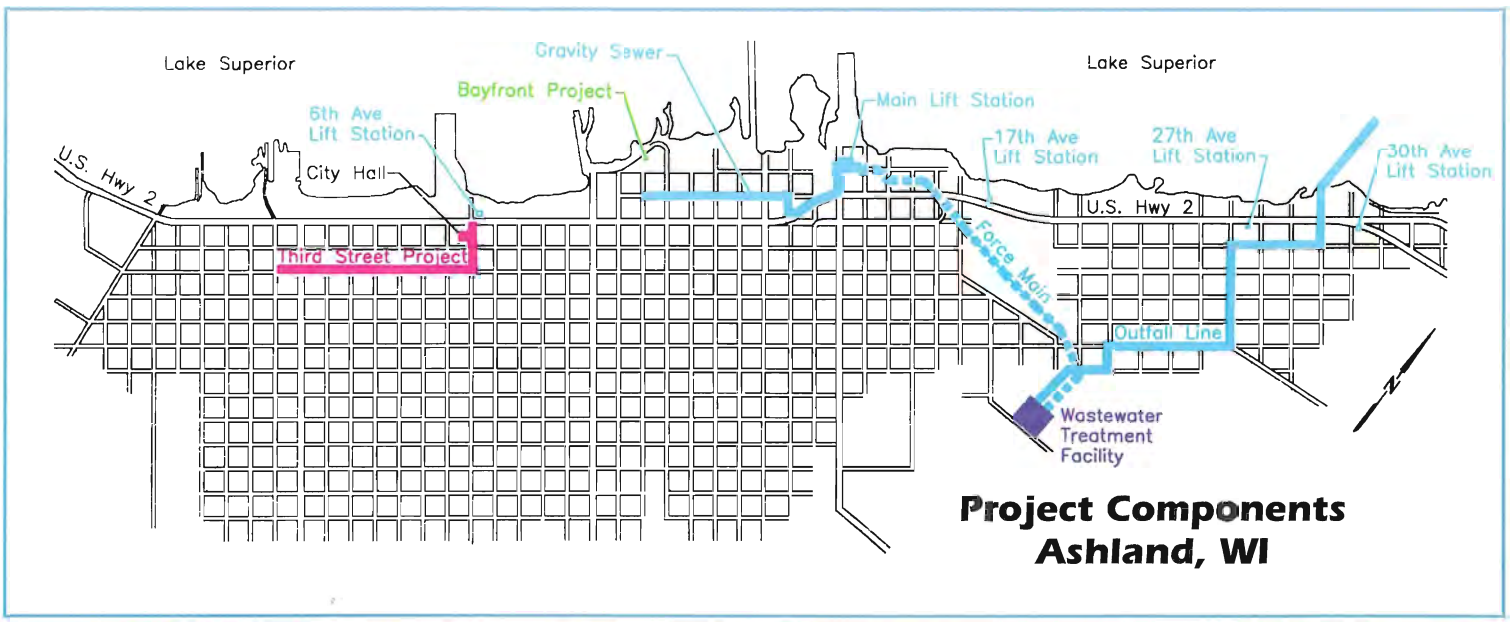
Wastewater Process

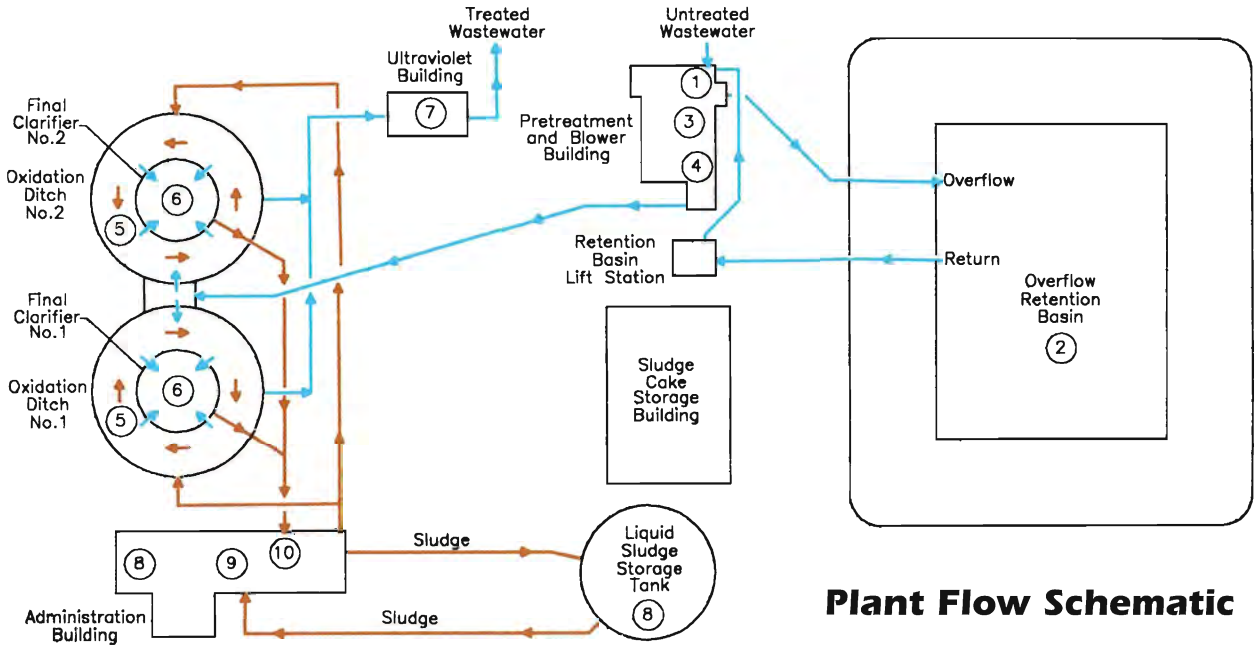
1) Wastewater Conveyance: Wastewater throughout the City is conveyed through 37 miles of sanitary sewers to the main lift station located at 11th Avenue East and Water Street. It is pumped by six 150-horsepower pumps to the treatment plant through a 24-inch force main. The pumps are sequenced, and their speed is controlled to match incoming flow. Normally, only one or two pumps operate. However, all six pumps are used during wet weather flows.

2) Overflow Retention Basin: During heavy rainfall and snowmelt, the retention basin is used to store flows which exceed the 3.84 million gallons-per-day plant capacity. The basin can hold 8 million gallons. Excess flows are diverted to the basin, aerated, and held until plant flows decrease. The wastewater in the retention basin is then gradually pumped through the plant for treatment.

3) Static Screens: Four static screens collect solids larger than 1/16 inch. The collected solids are conveyed to a press for dewatering prior to being hauled to the landfill.

4) Aerated Grit Tank: Sand-like solids settle in the grit tank. The settled grit is pumped, dewatered, and hauled to the landfill with solids collected by the static screens.





Plant Flow Schematic

5) Oxidation Ditches: Biological treatment of the wastewater takes place in the two oxidation ditches. Raw wastewater is mixed with microorganisms that feed on bacteria and organic material. The microorganisms clump together to form a biological floc. Air and alum, a chemical that reduces phosphorus in wastewater, are added to the process at this point.

6) Final Clarifiers: Flow from the oxidation ditches enters the final clarifiers. The flow comes up through the center and slowly moves to the outside of the clarifiers. This movement allows the biological floc to settle. The clean treated water flows over the outside edge of the clarifiers to disinfection. The biological floc is returned to the oxidation ditches to continue the biological treatment process. Excess sludge is pumped to the sludge storage basin.

7) Disinfection: The treated wastewater flows through two banks of ultraviolet (U.V.) lamps which destroy pathogens and other disease-causing organisms. Each U.V. bank consists of 96 lamps spaced three inches apart. This plant is the first in northern Wisconsin to use this cost-effective technology for disinfection, which replaces the chlorine disinfection process.

8) Solids Handling: A portion of the sludge produced by the biological process is pumped to the aerated sludge storage tank. Sludge in this tank can be removed and spread on agricultural land or further processed through the Belt Filter Press. The Press dewaters and dries the sludge, forming a thickened cake-like substance. The cake sludge can be spread on agricultural land or stored in the sludge storage building for future application.

9) Process Control: Process monitoring and control is maintained by a Supervisory Control and Data Acquisition (SCADA) System. The major components of the SCADA system are programmable logic controllers, personal computers and monitoring equipment such as flow meters and dissolved oxygen analyzers. The SCADA system also monitors remote lift stations using a mixture of radio and telephone communications equipment. Historical data of the wastewater system's performance is compiled by the SCADA system. The data is used to optimize system operation and to forecast the City's future needs.

10) Laboratory: Testing for parameters such as BOD (Biological Oxygen Demand), TSS (Total Suspended Solids), phosphorous, and fecal coliform is conducted daily to help optimize and track plant performance and to meet state regulatory requirements.

Design Summary

Design Flow: . . . . . 1.92 MGD

Peak Process Flow: . . . . . 3.84 MGD

Peak Flow: . . . . . 18.9 MGD

Average BOD_5 Loading: . . . . 3,500 PPD

Average Suspended Solids Loading:
. . . . . 2,900 PPD

Average Phosphorous Loading:
. . . . . 105 PPD

Average Ammonia Nitrogen Loading:
. . . . . 600 PPD

Effluent BOD_5 Standard: . . . . 30 mg/l

Effluent Suspended Solids Standard:
. . . . . 30 mg/l

Effluent Phosphorus Standard:
. . . . . 1 mg/l

Effluent Ammonia Nitrogen Standard:
. . . . . 1 mg/l

Effluent Fecal Coliform Limit:
. . . . . 400 per 100 ml

Design Population: 11,050

Design Year: 2010

Note: MGD = million gallons per day
BOD_5 = 5 day biological oxygen demand
PPD = pounds per day
mg/l = milligrams per liter

Cost Summary

Wastewater Treatment Plant:
. . . . . $ 7.3 million

Conveyance Facilities: . . . . . 3.1 million

Third St. Utility & Street Improvements: . . . . . 1.2 million

Bayfront Area Sanitary Sewer Improvements: . . . . . 0.1 million

Total Construction Cost . . . $11.7 million

Funding

Farmers Home Administration Grant: . . . . $ 4.1 million

State of Wisconsin Clean Water Fund Loan: . . $ 7.6 million
(20 Years at 1% Interest)

Project Participants

Owner: . . . . . City of Ashland

Water and Wastewater Utility:

Commissioners . . . . . Ed Oschenbaur
. . . . . Harvey Haukaas
. . . . . Gordon Parent
. . . . . Frank Nolan
. . . . . Myron Anderson

Former Commissioners . . . . . M.A. (Red) Renerio
. . . . . Robert Melin
. . . . . LeRoy Lee

Utility Manager . . . . . Stephan Brand

Wastewater Superintendent . . David Wosepka

Wastewater Plant Staff . . . . . 8 Employees

Engineers and Architects:

Bonestroo
Rosene
Anderlik &
Associates
Engineers & Architects
St. Paul • Milwaukee

General Contractors:

Barbarossa & Sons - Osseo, MN
Wastewater Treatment Plant and
Conveyance Facilities

S.J. Louis Construction - St. Cloud, MN
Third Street Utility and Street Improvements
and Bayfront Area Sanitary
Sewer Improvements